

Amend claim 10 to read as follows:

10. (Once Amended) An apparatus for providing an electro-optic interface for exchanging information signals, such apparatus comprising:

an array of optical devices disposed adjacent an optically transparent substrate, with a transmission path of each of the plurality of optical devices of the optical array passing directly through the substrate;

an optically transparent underfill disposed between the optically transparent substrate and adjacent optical array where the underfill does not provide an electrical path for the optical device; and

an optical connector for holding a plurality of optical fibers and for guiding the plurality of optical fibers into alignment with the transmission paths of optical array.

REMARKS

1. Reconsideration and further prosecution of the above-identified application are respectfully requested in view of the amendments and discussion that follows. Claims 1-27 are pending in this application. Claim 1 has been rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,990,498 to Chapnik et al. Claims 2-5 and 7-9 have been rejected under 35 U.S.C. §103(a) as being obvious over Chapnik et al. in view of U.S. Patent No. 6,356,686 to Kuczynski. Claim 6 has been rejected under 35 U.S.C. §103(a) as being obvious over Chapnik et al. in view of Kuczynski and U.S. Patent No. 4,556,289 to Fergason. Claims 10-14 and 16-18 have been rejected as being obvious over Chapnik et al. in view of Kuczynski. Claim 15 has

been rejected as being obvious over Chapnik et al. in view of Kuczynski and Fergason. Claims 21 and 26 have been rejected as being obvious over Chapnik et al. in view of Kuczynski and Fergason. Claims 23 and 27 have been rejected as being obvious over Chapnik et al. in view of Kuczynski. After a careful review of the claims, it has been concluded that the rejections are in error and the rejections are, therefore, traversed.

2. Paragraph [0017] has been amended to correct certain grammatical errors. The changes to paragraph [0017] clarify that which is already shown in FIG. 3.

3. In order to further clarify the scope of the invention, claims 1, 10, 19 and 24 have been further limited to a "unitary array or optical devices" and to an underfill that "does not provide an electrical path for the optical device". Support for the unitary array of optical devices may be found at numerous places within the specification (e.g., par. [0018], FIGs. 1-5, etc.).

Support for the non-conductive underfill may be found in the fact that the array 44 is provided with "conventional electric contacts 72 (i.e., solder or stud bumps), and electrical traces . . . the stud bumps electrically attach the optical array to the substrate 52" (specification, par. [0017]) and the fact that a person of skill in the art would understand that conventional electrical contacts would require a non-conductive underfill between the contacts.

4. Claim 1 has been rejected as being anticipated by Chapnik et al. In particular, the Examiner asserts that

"Chapnik teaches a light-emitting diode comprising:

disposing an optical array (12 & 5, 1+) adjacent a first side of an optically transparent substrate (20'), such that a plurality of transmission paths of the optical array pass directly through the substrate (14);

applying an optically transparent underfill (54) between the substrate and adjacent optical array, with the plurality of transmission paths of the optical array passing directly through the underfill (14); and coupling a plurality of optical signals of the optical array through the optically transparent underfill and optically transparent substrate between the optical array and an optical element, which could be a connector (5, 57+)".

As may be best understood from the Examiner's comments, the Examiner has apparently taken the position that the term "optical array" is broad enough to cover the elements of a single optical device. In response, independent claim 1 has been amended to make clear that the optical array is a unitary element that includes a plurality of optical devices.

Since the claims are now limited to a unitary array of a plurality of optical devices and Chapnik et al. discloses only a single device, Chapnik et al. can no longer be considered as anticipatory art. Since Chapnik et al. is no longer anticipatory art, the rejection is believed to be improper and should be withdrawn.

5. Claims 2-5 and 7-9 have been rejected as being obvious over Chapnik et al. in view of Kuczynski. However, Chapnik et al. and Kuczynski could not be combined to produce the claimed invention without changing an essential characteristic of Chapnik et al. For example, Chapnik et

al. requires an electrode 16' on the bottom surface of the LED 50 to activate the LED 50. Moreover, Chapnik et al. necessarily could not operate without the electrode 16'. As taught by Chapnik et al. "the adhesive 54 or first electrode 16', singly or alone, can be fabricated by inserting conductive particles 56 into an otherwise non-conductive epoxy" (Chapnik et al., col. 4, lines 25-28).

FIGs. 3, 4A-B, 5 all show the power source as being connected between the second electrode 52' and the first electrode 16'. The adhesive 54 is interposed between the electrode 16' and the LED 12. Since the adhesive 54 is interposed between the LED 12 and electrode 16', the adhesive must necessarily be conductive in all cases.

The claims have now been limited to a non-conductive underfill. Since Chapnik et al. requires a conductive underfill and Kuczynski has no underfill, the combination of Chapnik et al. and Kuczynski fail to teach this essential element. Since the combination fails to teach each and every claim limitation, the rejection is now believed to be improper and should be withdrawn.

6. Claim 6 has been rejected as being obvious over Chapnik et al. in view of Kuczynski and Fergason. However, as with Chapnik et al. and Kuczynski, Fergason fails to teach or suggest a unitary array of a plurality of optical devices disposed on a transparent substrate with a transparent non-conductive underfill. Since the combination fails to teach each and every claim limitation, the rejection is now believed to be improper and should be withdrawn.

7. Claims 10-14 and 16-18 have been rejected as being

obvious over Chapnik et al. in view of Kuczynski. However, as demonstrated above, the combination fails to teach each and every claim limitation. Since the combination fails to teach each and every claim limitation, the rejection is now believed to be improper and should be withdrawn.

8. Claim 15 has been rejected as being obvious over Chapnik et al. in view of Kuczynski and Fergason. However, as demonstrated above, the combination fails to teach each and every claim limitation. Since the combination fails to teach each and every claim limitation, the rejection is now believed to be improper and should be withdrawn.

9. Claims 21 and 26 have been rejected as being obvious over Chapnik et al. in view of Kuczynski and Fergason. However, as demonstrated above, the combination fails to teach each and every claim limitation. Since the combination fails to teach each and every claim limitation, the rejection is now believed to be improper and should be withdrawn.

10. Claims 23 and 27 have been rejected as being obvious over Chapnik et al. in view of Kuczynski. However, as demonstrated above, the combination fails to teach each and every claim limitation. Since the combination fails to teach each and every claim limitation, the rejection is now believed to be improper and should be withdrawn.

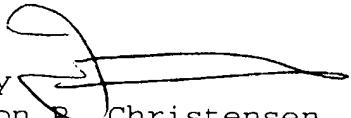
11. It is noted next that the patentability of claims 19, 20, 22, 24 and 25 has not been addressed in this Office Action. It is noted in this regard that pages 7-8 contain the statement that "Claims 21 and 26 are rejected under 35

U.S.C. 103(a) as being unpatentable over Chapnik et al., US Patent 5,990,489, in view of Kuczynski, US Patent 6,356,686, as applied to claims 19 and 24 respectively above, and further in view of Fergason, US patent 4,556,289". Page 8 contains a similar statement with regard to claims 23 and 27.

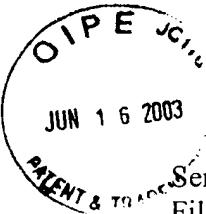
It is believed in this regard that a vague reference to rejection is insufficient. In order for a rejection to be legally sufficient, the basis of the rejection must be provided. Since no basis for the rejection of claims 19, 20, 22, 24, 25 has been provided, the Office Action of 3/12/03 is incomplete and should be withdrawn.

12. Allowance of claims 1-27, as now presented, is believed to be in order and such action is earnestly solicited. Should the Examiner be of the opinion that a telephone conference would expedite prosecution of the subject application, he is respectfully requested to telephone applicant's undersigned attorney.

Respectfully submitted,
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Marked Up Specification

FIG. 3 illustrates a cut-away side view of a portion of the optical array 44 attached to the optically transparent substrate 52. The [substrate 52] optical array 44 may have disposed on a first surface 64 of the substrate 52. C[c]onventional electrical contacts 72 (i.e., solder or stud bumps), and electrical traces (not shown) may be used for electrically connecting the optical array 44 to a signal processing device (not shown). In a preferred embodiment of the invention, stud bumps electrically attach the optical array 44 to the substrate 52. An optically transparent underfill 62 mechanically attaches the optical array 44 to the first surface of the substrate 64. The details of the optically transparent underfill 62 will be described in further detail below.

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Marked Up Claims

1. (Once Amended) A method of providing an electro-optic interface for exchanging information signals, such method comprising the steps of:

disposing a[n optical] unitary array of a plurality of optical devices adjacent a first side of an optically transparent substrate, such that a [plurality of] transmission path[s] of each of the plurality of optical devices of the optical array pass directly through the substrate;

applying an optically transparent underfill between the substrate and adjacent optical array, with the plurality of transmission paths of the optical array passing directly through the underfill and where the underfill does not provide an electrical path for the optical device;

coupling [a plurality of] an optical signal[s] of each the plurality of optical devices of the optical array through the optically transparent underfill and optically transparent substrate between the optical array and an optical connector.

10. (Once Amended) An apparatus for providing an electro-optic interface for exchanging information signals, such apparatus comprising:

an [optical] array of optical devices disposed adjacent an optically transparent substrate, with a [plurality of] transmission path[s] of each of the plurality of optical devices of the optical array passing directly through the substrate;

an optically transparent underfill disposed between the optically transparent substrate and adjacent optical array where

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the underfill does not provide an electrical path for the optical device; and

an optical connector for holding a plurality of optical fibers and for guiding the plurality of optical fibers into alignment with the transmission paths of optical array[;].